

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

REAL VIEW, LLC)	
)	
Plaintiff)	Civil Action No. 07-12157
PBS)	
v.)	
20-20 TECHNOLOGIES, INC.)	
)	
Defendant)	
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20-20 TECHNOLOGIES, INC.)	
)	
Counterclaim Plaintiff)	
v.)	
REAL VIEW, LLC)	
)	
Counterclaim Defendant)	
and)	
BORIS ZELDIN and LEONID PERLOV)	
)	
Third Party Defendants)	
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**EXPERT DISCLOSURE OF RANDALL DAVIS
ON BEHALF OF 20-20 TECHNOLOGIES, INC.**

Defendant and plaintiff-in-counterclaim 20-20 Technologies, Inc. ("20-20") hereby identifies Randall Davis as its software expert to testify in this trial of this matter. Dr. Davis' expert report, curriculum vitae and a list of his testimonial experience since January 1, 1991 are attached hereto.

20-20 TECHNOLOGIES, INC.

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UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

Real View, LLC., Plaintiff v. 20-20 Technologies, Inc. Defendant	No. 07-12157
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EXPERT REPORT OF
RANDALL DAVIS

5 May 2009

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I. INTRODUCTION

1. I am a Professor of Computer Science at the Massachusetts Institute of Technology. I have been retained by counsel for 20-20 Technologies to examine and compare 20-20 Design and ProKitchen.

2. My background and experience are detailed in Exhibit A. In brief, I am a Professor of Computer Science at the Massachusetts Institute of Technology, having received an undergraduate degree from Dartmouth, graduating summa cum laude, Phi Beta Kappa in 1970, and a Ph.D. from Stanford University in artificial intelligence in 1976. I came to M.I.T. as an assistant professor in 1978, and served for five years as Associate Director of the M.I.T. Artificial Intelligence (A.I.) Laboratory. From 2004 until 2007 I served as a Research Director in the 850-person M.I.T. Computer Science and Artificial Intelligence Laboratory that resulted from the merger of the A.I. Lab and the Lab for Computer Science.

3. My research group and I develop advanced tools that permit natural multi-modal interaction with computers by creating software that understands users as they sketch, gesture, and talk.

4. I have published approximately 50 technical articles related to artificial intelligence. I have served on several editorial boards, including *Artificial Intelligence*, *AI in Engineering*, and the M.I.T. Press series in A.I. I am a co-author of *Knowledge-Based Systems in AI*.

5. In recognition of my research, I was selected in 1984 as one of America's top 100 scientists under the age of 40 by *Science Digest*. In 1986, I received the *AI Award* from the Boston Computer Society for contributions to the field. In 1990, I was named a Founding Fellow of the American Association for A.I. In 1995, I was elected to a two-year term as President of the Association. In 2003, I received M.I.T.'s Frank E. Perkins Award for graduate advising. From 1995-1998, I served on the Scientific Advisory Board of the U. S. Air Force.

6. I have been a consultant to several major organizations, including Digital Equipment Corp, I.B.M., Aetna, and Schlumberger. I also have been involved in the founding of three software companies.

7. In addition to my work with artificial intelligence, I have also been active in the area of intellectual property and software. Among other things, I have served as a member of the Advisory Board to the U.S. Congressional Office of Technology Assessment study on software and intellectual property, published in 1992 as *Finding a Balance: Computer Software, Intellectual Property, and the Challenge of Technological Change*. I have published a number of articles on the topic, including co-authoring an article in the *Columbia Law Review* in 1994 entitled "A Manifesto Concerning Legal Protection of Computer Programs," and an article in the *Software Law Journal* in 1992 entitled "The Nature of Software and its Consequences for Establishing and Evaluating Similarity." From 1998-2000, I served as the chairman of the National Academy of Sciences study on intellectual property rights and the emerging information infrastructure entitled *The Digital Dilemma: Intellectual Property in the Information Age*, published by the National Academy Press in February, 2000.

8. In 1990 I served as expert to the Court in *Computer Associates v. Altai*, (775 F. Supp. 544 (E.D.N.Y. 1991); 982 F.2d 693) a case that produced the abstraction, filtration, comparison test for software copyright. In 1998 I served as the US Government's expert in the Inslaw matter (40 Fed. Cl. 843; 1998 U.S. Claims), where I investigated allegations of copyright theft and cover-up by the Federal Bureau of Investigation, the National Security Agency, the Drug Enforcement Agency, the United States Customs Service, and the Defense Intelligence Agency

9. This report is based on my experience and expertise in the field of computer science and review of the materials cited in the text and exhibits of this report.

II. SUMMARY AND OVERVIEW OF THIS REPORT

10. I find that:

- a) The user interface of ProKitchen is substantially similar to that of 20-20 Design.
- b) The similarities range from the selection and organization of elements of the overall layout of the screen, down to selection and arrangement of minor details of both programs.
- c) In at least one case, the similarity is so detailed that ungrammatical text found in a version of the 20-20 Design interfaces appears verbatim in a version of ProKitchen.
- d) The similarities are extensive enough that familiarity with one program is sufficient to enable facile use of the second with almost no additional training. This is manifestly not the case for most programs, even those designed to do the same task.
- e) The similarities are extensive enough that ProKitchen might easily be thought of by a user as a different version of 20-20 Design. That is, the two programs share as much of their user interface design as is routinely found between two subsequent versions of the same program produced by one company (e.g., the difference between Microsoft's Word 2000 and Word 2003).
- f) Both of these programs fit into a common hierarchy of program types: they are computer-aided design (CAD) systems, aimed at architectural design more specifically, and aimed at kitchen design more specifically still.
- g) Some number of the individual interface elements of the design of both programs can be found in other CAD systems, other architectural design software, and other kitchen design software. But the selection and organization of those elements is vastly more similar between 20-20 Design and ProKitchen than it is between either of those and any of the other programs I examined.

11. I have also been asked to comment on the relative value of the user interface. While a quantitative analysis is beyond the scope of this document, it is fair to say that in a market situation where the leaders provide roughly comparable functionality, program usability becomes increasingly important. Simply put, if people can get the capabilities they need from more than one program, they place increasing emphasis on how easy and intuitive those programs are to use.

III. BACKGROUND

12. There is a long history of CAD software designed to make it easier to design and visualize, dating back at least to Ivan Sutherland's famous Sketchpad program in 1963. Over the years the software has evolved in parallel with the transition of computers from strictly industrial devices to home appliances. Software for home and garden design intended for retail customer use is now widely available, as well as more sophisticated programs intended for home design and renovation companies.

13. 20-20 Design has been in this field since at least 1987. 20-20 Design Version 6.1 was released in August 2002. I understand that subsequent versions have appeared over time, including 6.4 (Sept 2003), 8.0 (May 2006), and 8.1 (Spring 2008).

14. The first appearance of RealView's ProKitchen appears to be January 2006 (version 1.0), with subsequent versions over the next two years, including 2.0 (Jan 2007) and 3.0 (Feb 2008).

15. I understand that RealView acknowledges obtaining a copy of 20-20 Version 6.1, installing it and examining it, allegedly so it could determine what features ProKitchen lacked and what it could add to surpass 2020 in usability. I further understand that ProKitchen development began in 2004, i.e., at a time when 20-20 Design Version 6.1 had been on the market for roughly two years.

IV. COMPARING 20-20 DESIGN AND PROKITCHEN

16. I considered five programs in my comparison:

- Version 6.1 and Version 8.1 of 20-20 Design,
- Version 2.0 and 3.0 of ProKitchen
- Planit FusionLive 14.2.8
- Chief Architect X2 Trial Version (downloaded from their web site)

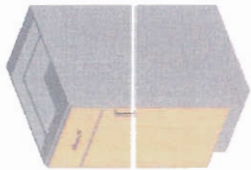
- Configura CET Designer 2.2 (trial version, downloaded from their web site)

17. I focused primarily on ProKitchen 3.0 and the two versions of 20-20 Design, as the similarities between these two were far more extensive than between 20-20 and any of the other programs. The comparison I have done is reasonably thorough, but not exhaustive; additional similarities may become evident as I continue work.

18. As noted above, similarities between the user interfaces of 20-20 Design and ProKitchen are numerous and extensive, ranging from the selection and arrangement of the overall screen display, down to interface details controlling how to draw walls. Unless otherwise indicated, comparisons below are between 20-20 Version 6.1 and ProKitchen Version 3, and for the sake of concreteness, I use a simple kitchen design that I created.

19. As the issues here concern the user interface, the points are best made by illustration. We begin with the overall screen layout:¹

¹ Throughout the document screen shots have been re-sized for legibility and to provide convenient side-by-side comparison when relevant.



SAMPLE_E
< Categories >
Base
Base Door/Drawer
Base Door/Drawer Standard

- | | > Tray Base |
|-------|-------------|
| T609R | > Tray Base |
| T809L | > Tray Base |
| B12R | > Base |
| B12L | > Base |
| B15R | > Base |
| B15L | > Base |
| B18R | > Base |
| B18L | > Base |
| B21R | > Base |
| B21L | > Base |
| B24R | > Base |
| B24L | > Base |
| B24 | > Base |
| B27 | > Base |
| B30 | > Base |
| B30-2 | > Base |
| B33 | > Base |
| B33-2 | > Base |
| B36 | > Base |
| B36-2 | > Base |
| B39 | > Base |

ProKitchen



20. The two programs share routine interface design elements, including the presence of a set of drop-down menus across the top, under which there are a set of icons that offer fast access to many of the same things found in the menus. The rest of the window is the work area, which is in turn subdivided into multiple smaller windows. As all of these are standard Windows interface conventions, it is unsurprising to find them in both programs.

21. There are however, numerous similarities that are not explained on this basis. In both cases the left side of the screen contains the same sequence of sub-windows: an information box, an edit box, a hierarchical catalog box, a drag and drop listing. There is also a search box in both, at the bottom in 20-20 Design and next to the bottom in ProKitchen.

22. In both there is a vertical set of icons next to these boxes, with only a minor variation in precise placement.

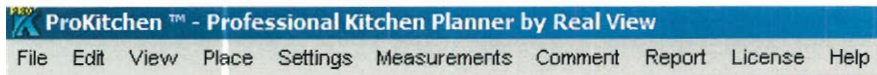
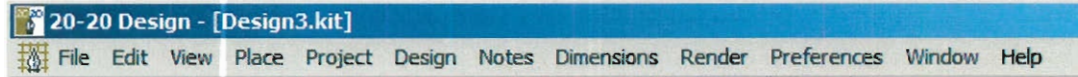
23. In both the main window is subdivided into a plan and elevation view, with the plan at the bottom and the elevation at the top. In both, design changes made in one of these views are immediately reflected in the other.

24. In both programs both the plan and elevation windows have multiple tabs, enabling multiple views of the design; these tabs are re-nameable.

25. A non-trivial part of getting trained on and oriented to a new piece of software involves coming to understand its overall layout and presentation of information and icons, i.e., how it presents its view of the task. The overall layout of these two programs is so similar that familiarity with one would instantly provide facility with the other. This is manifestly not the case with any of the other programs I examined.

26. While menus across the top are routine in Windows programs, the content of those menus of course differs. Yet these two programs have clear evidence of similarities in the selection and arrangement of the menus and their items.

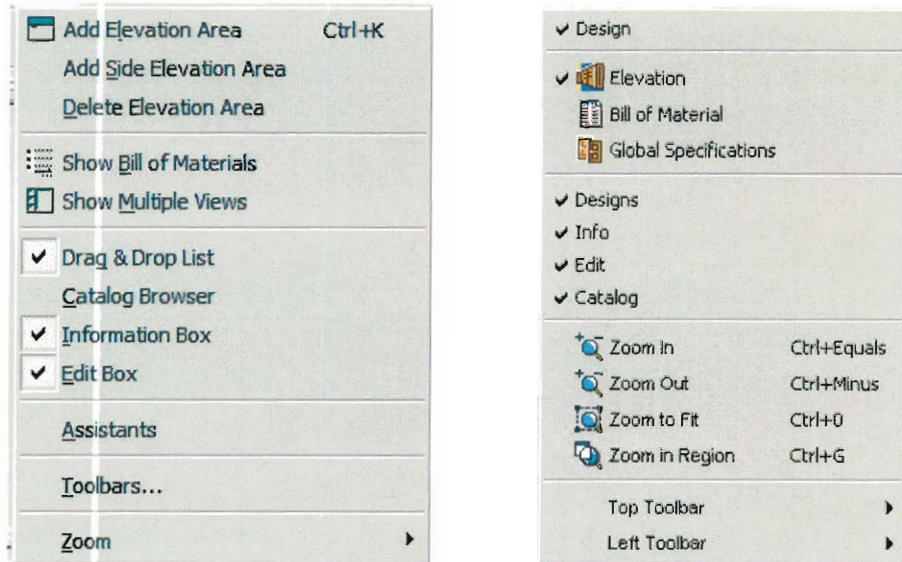
27. Consider the main menus:



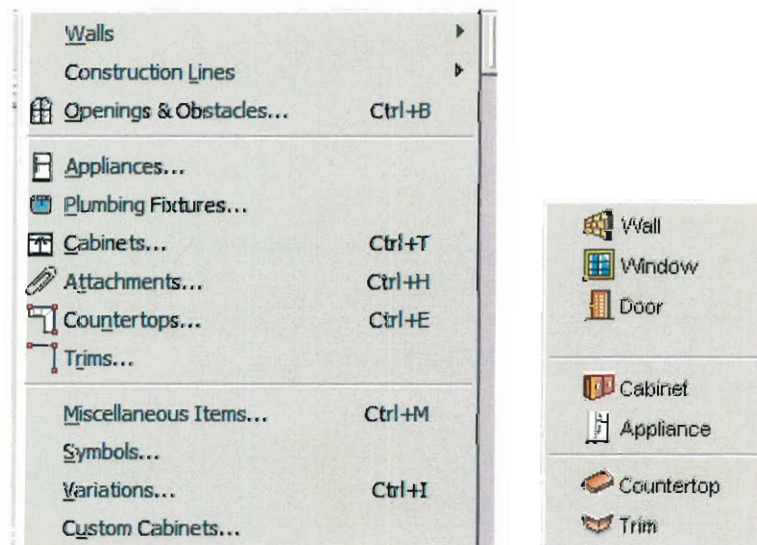
28. In both we find Place, Notes/Comment, Dimensions/Measurements. (As a notational shorthand, I use name1/name2 to indicate that 20-20 Design uses name1 for something while ProKitchen uses name2.)

29. Examining the submenus, and filtering out menu choices that are either routine in Windows programs or commonly found in CAD/drawing programs, we find additional similarities of selection and arrangement:

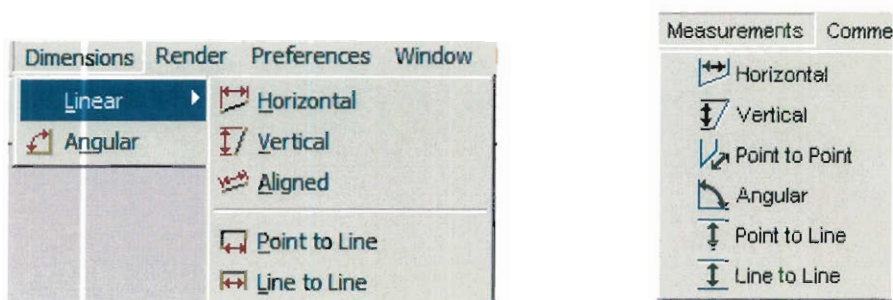
- File menu: Save as Image
- Edit menu: Attributes/Attribute
- View menu: Add Elevation Area/Elevation, Show Bill of Materials/Bill of Material, Drag & Drop List/ Catalog, Information Box/Info, Edit Box/Edit (in side-by-side listings, 20-20 Design examples are on the left):



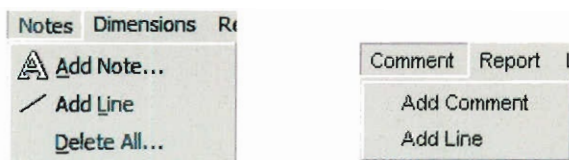
- Place menu: Walls/Wall; Openings & Obstacles/Window, Door; Appliances/Appliances; Cabinets/Cabinet, Countertops/Countertop, Trims/Trim



- Dimensions/Measurements: Identical set of six dimensions, in the same order, with almost identical icons.



- Notes/Comments: Same two out of three choices, in same order.



30. Next we turn to the horizontal toolbar found just under the main menus. As noted, having such a toolbar is a routine Windows convention, and some of the items on the toolbar would be found in most Windows programs. The selection and arrangement of the specific items on the toolbar, however, varies from program to program. Yet there are striking similarities in the two toolbars (20-20 at top):



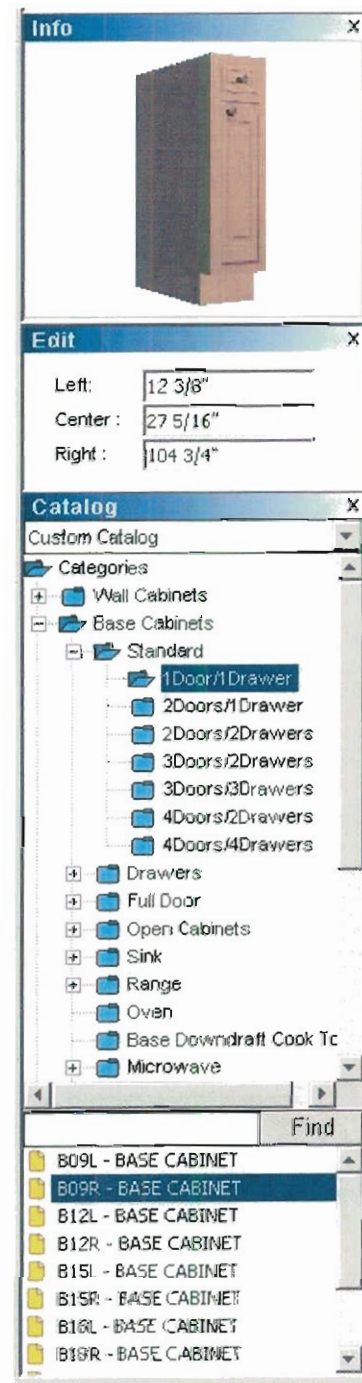
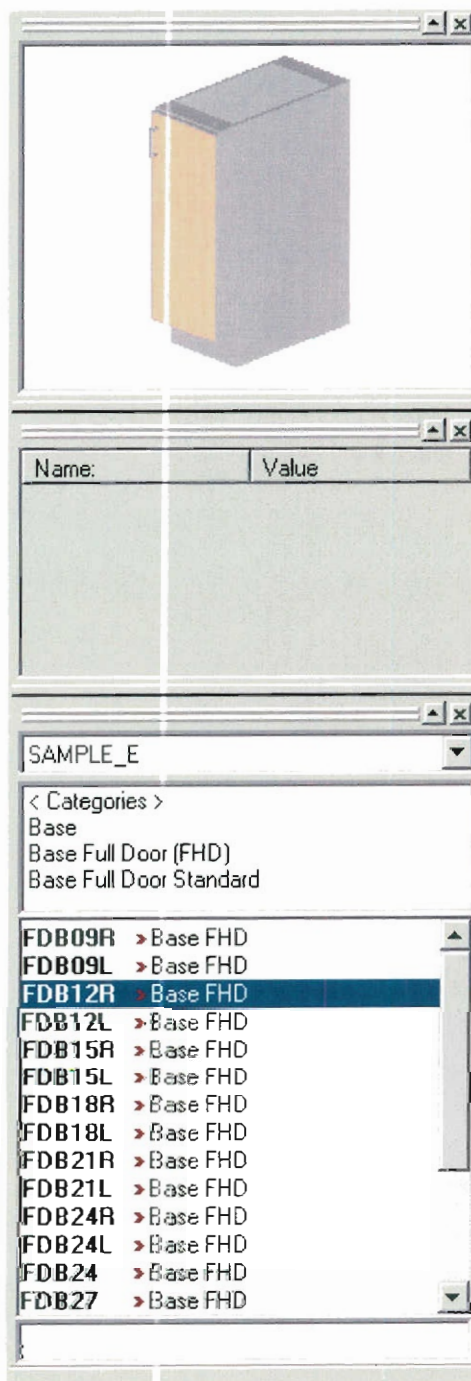
31. There is, for instance, the sequence of view modifiers of Select, Zoom in/out, Zoom to region, and Zoom to fit, as well as the presence of an Elevation view icon, a Bill of Materials icon, an Isometric View icon and the Perspective/3D icon.

32. The two vertical toolbars provide a yet more striking example, as there is no Windows, or CAD tool, convention to fall back on here, and because the two are so plainly similar in the selection, arrangement, and even the appearance of the icons:



33. There are 22 icons in the ProKitchen toolbar; of these 17 are found in 20-20, with almost identical icons and almost identical order: wall, construction line, u-shaped room, l-shaped room, rectangular room, cabinets, windows, doors, appliances, countertop, trim, horizontal distance, vertical distance, diagonal distance, angular distance, point to line distance, line to line distance.

34. As noted above, the group of sub-windows on the left side of the screen is strikingly similar in selection, arrangement, and appearance:



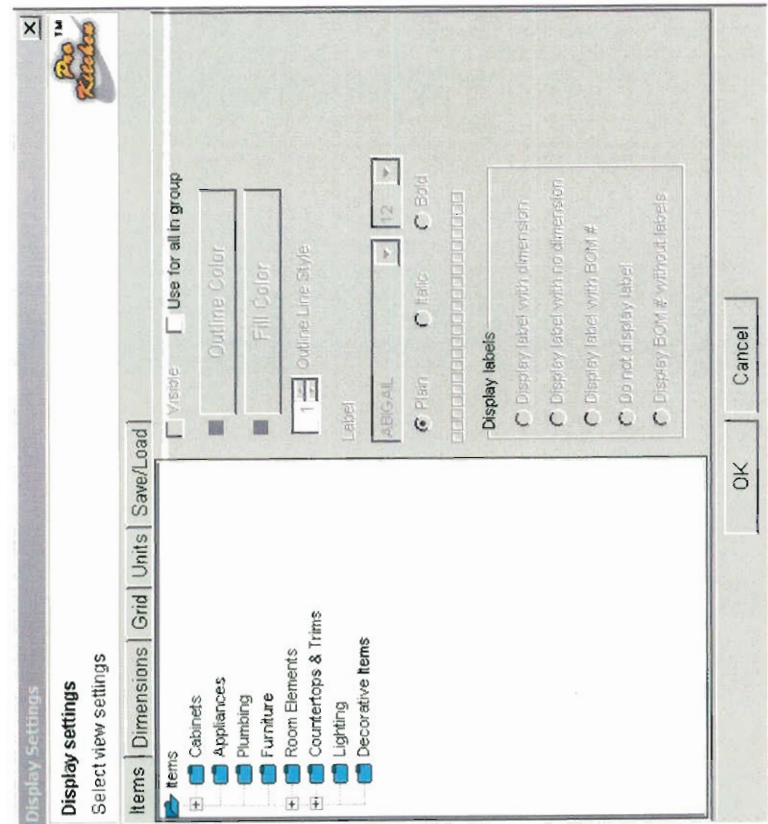
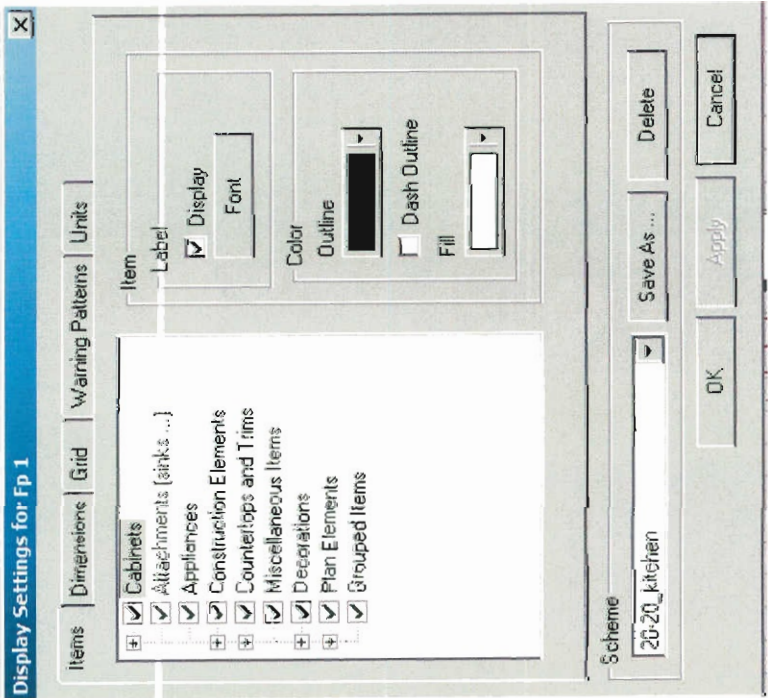
35. In both cases the group starts with a panel that previews the item to be placed in the design, followed by an edit window, where size and placement details can be viewed, or entered manually (e.g., you can either drag an item to place it or change its size, or simply type in the relevant position or measurements).

36. Next there is a hierarchical catalog window, allowing the user to browse through available design items, followed by a select and drag window – once an item is highlighted from the list at the bottom, it can be placed in the design using the mouse.

37. The Find window works identically, allowing the user to type part or all of a component code (e.g., FDB12) at which point the system will list only those components that start with this sequence of letters.

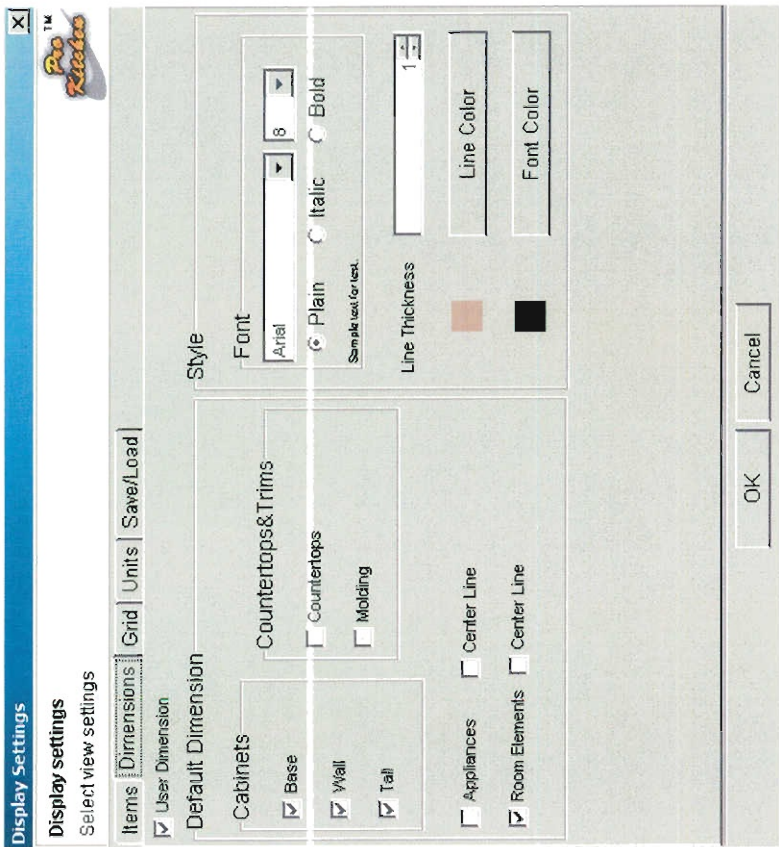
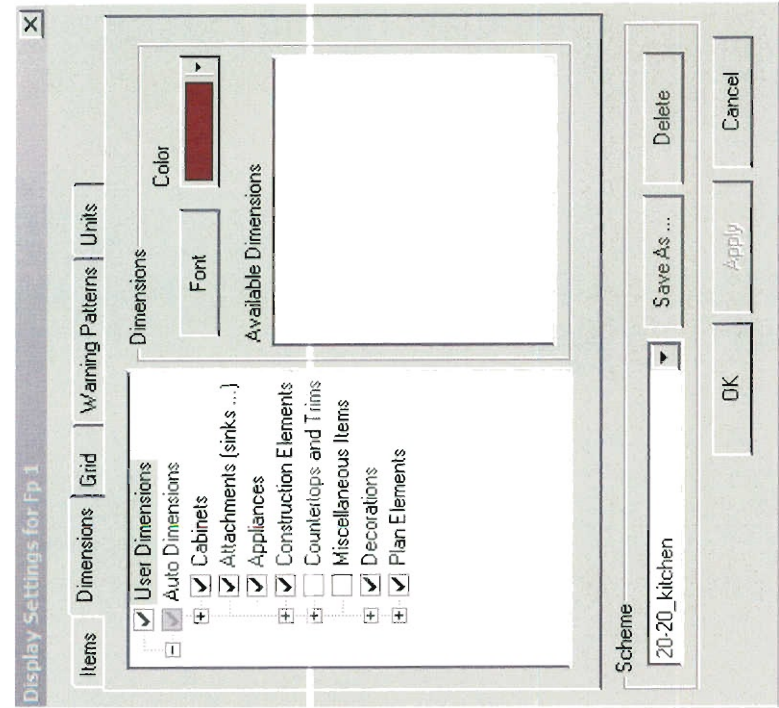
38. In both systems the expanded description of the items (e.g., the “Base FHD” text) can be eliminated with a right click of the mouse, simplifying the appearance of the listing.

39. The two systems provide a strikingly similar set of information boxes and selection of choices in response to the Display Settings menu item:

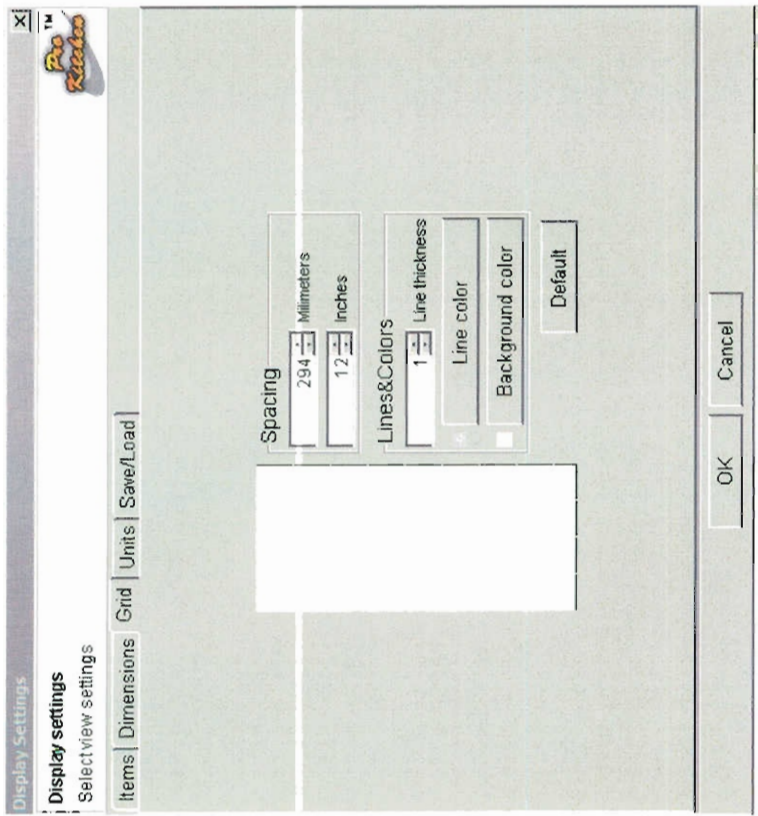
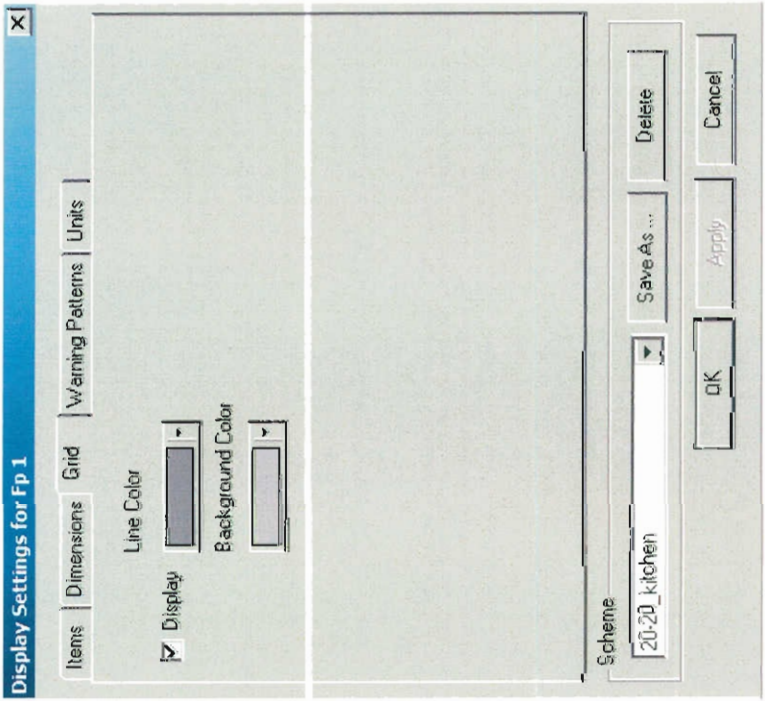


40. Note the selection and arrangements of tabs (Items, Dimensions, Grid, Units) and the similarity of layout.

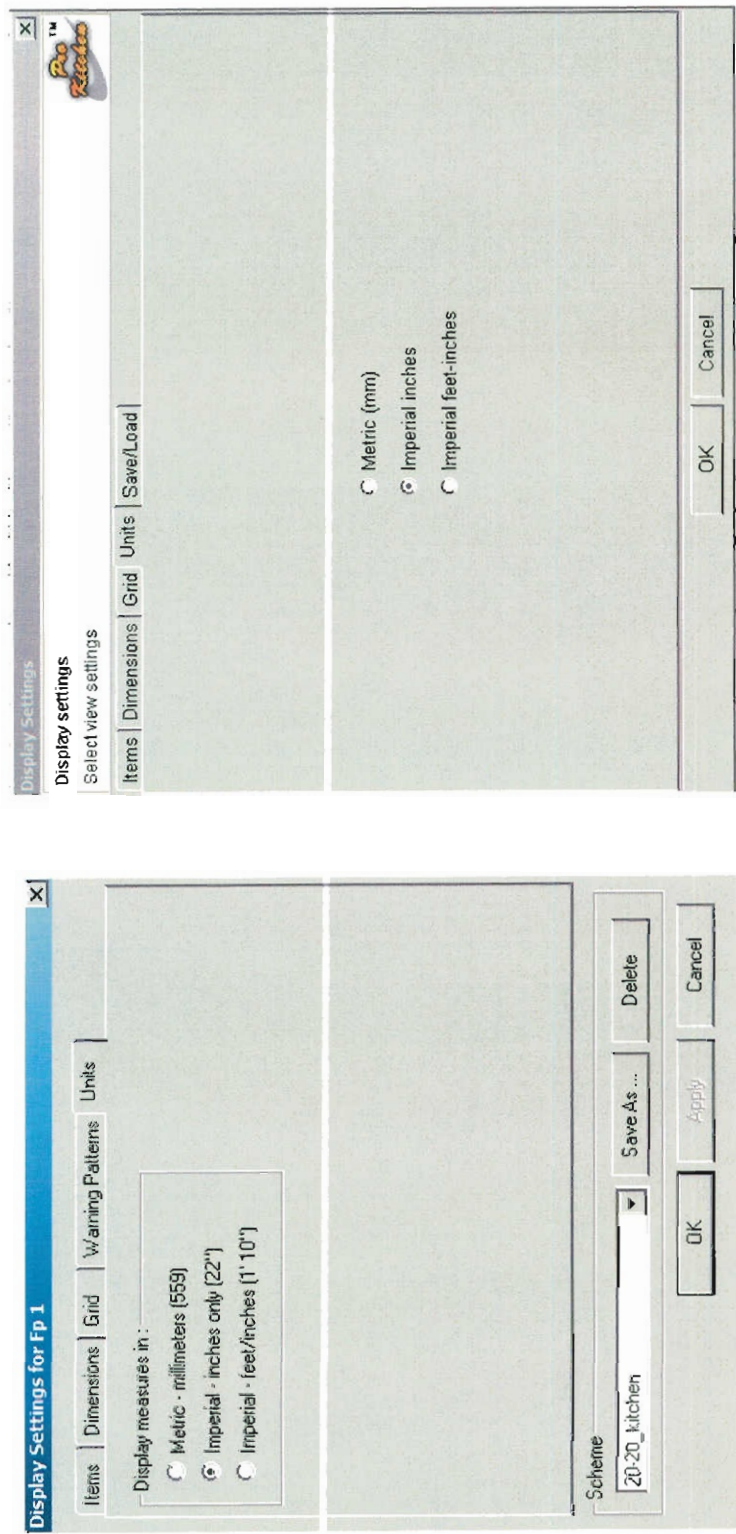
41. This continues on the Dimensions tab:



42. The Grid tab provides additional similarities, allowing the change of line color and background color.



43. The Units tab offers additional similarities, using the same ordering of choices in almost identical language:



44. One of the most basic things needed for a design is the placement of walls. These two programs provide virtually identical interfaces for the drawing and specification of walls, at both the high level and in the small details. At the high level they both provide similar icons in the same order, to indicate whether the wall is to be a standard (i.e., physical) wall, or a construction line:



45. Indeed, they use the same terminology of “construction line” to indicate a line used for aligning items on the design that is not a physical wall. A search through the manuals of other substantial programs (e.g., Chief Architect) demonstrates that this term – construction line – is not a standard term of art, and hence its appearance in both programs is revealing.
46. Consider too, that there is no particular reason a line used to align items should even be considered as a kind of wall. To the new user the notion that there are two kinds of walls – one real and one not – is confusing. Surely the same concept could appear in either program on its own, i.e., not as a variation on wall type, but as a wholly different notion. Yet it is the same, slightly confusing idea, in both programs.

47. In both programs walls can be drawn by clicking and moving the mouse, or by selecting the starting position of the wall and then typing in the edit box (below) to indicate wall length and orientation:

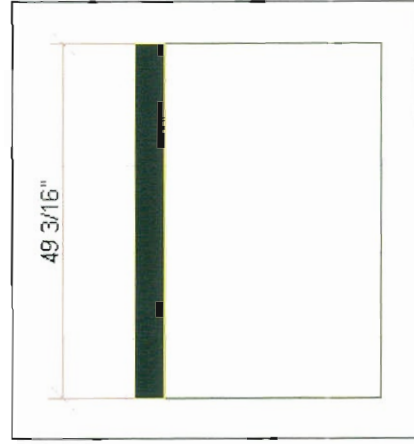
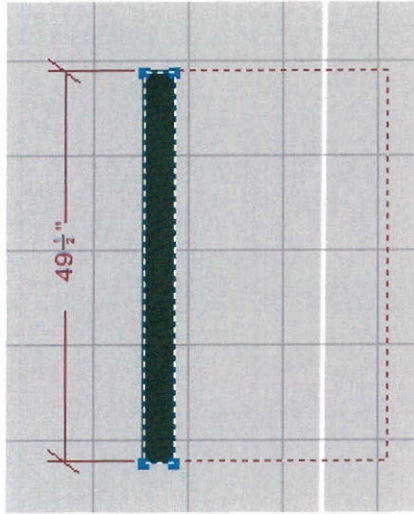
Name:	Value
Length	48"
Angle	180.00°

Edit x

Length : 48

Angle : 0

48. Once a wall has been drawn, it is dimensioned and a “Placement Zone” is automatically connected to it:

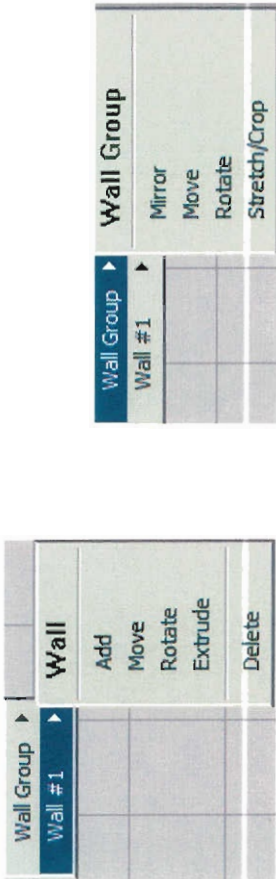


49. A placement zone is intended to facilitate the placement of objects such as cabinets and appliances, as these are typically placed up against walls. The term does not appear to be a standard term of art, yet appears in both programs and is similar in conception, execution, and appearance.

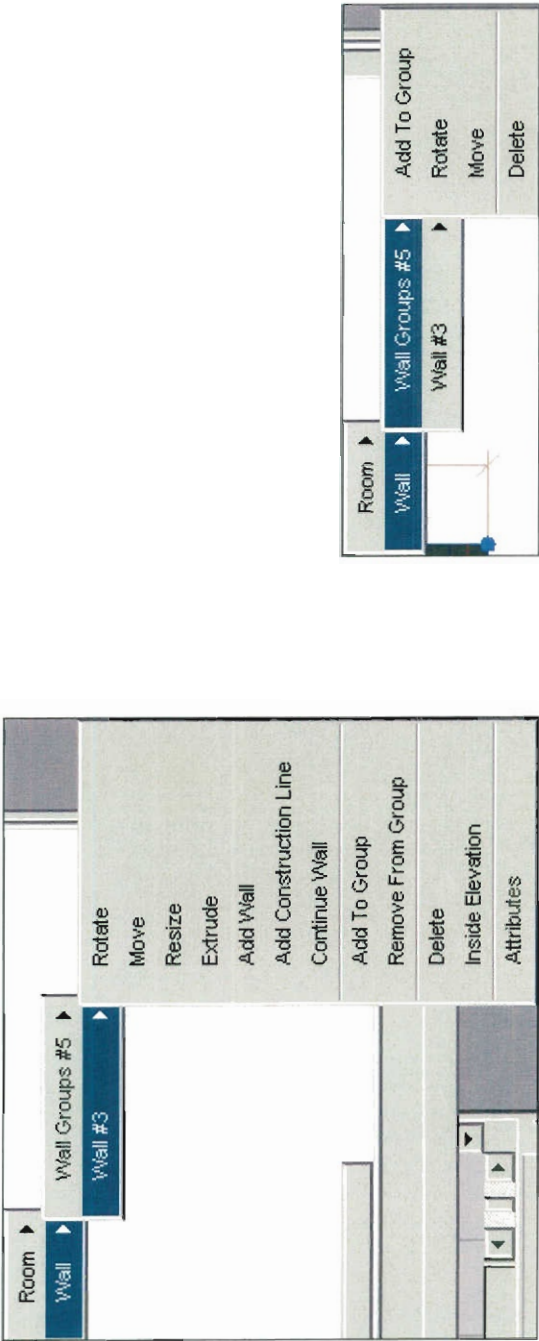
50. The similarity in the interface of the two programs extends down to the details of how walls are drawn with the mouse. In both, one wall segment can be ended and another started by clicking the left mouse. Clicking the right mouse allows the user to change the orientation of the wall without changing its length; clicking right again allows changing the length, clicking right again allows changing the orientation, etc. Both programs have made the somewhat obscure choice to have their interface offer this length/orientation alternation be based on repeated right mouse clicking, something I could find in none of the other programs.

51. Once walls have been drawn, they can be edited in both programs using almost identically organized menus. While right clicking on an object is a fairly standard Windows convention for pulling up what's termed a context menu, the contents of that menu are not specified by any Windows convention. Yet the selection and arrangement of the menus that appear are substantially similar:

Design 20-20

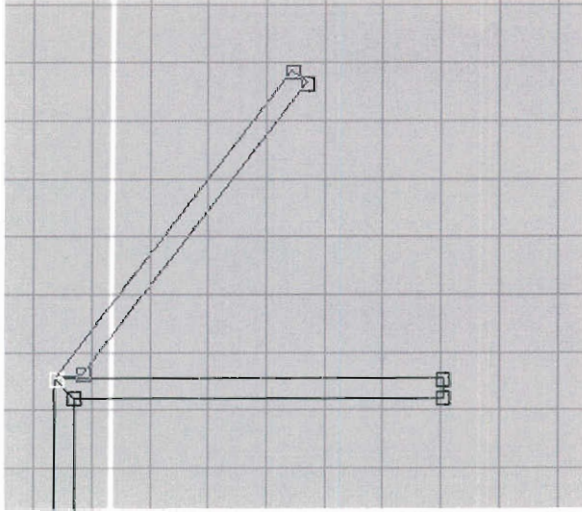


Pro-Kitchen



52. Note the similar presentation of “wall groups” and the common choices presented of add, move, rotate and extrude, as well as the choices for a wall group to Move and Rotate.

53. Rotating an existing wall (after it has been drawn) is likewise presented in an identical manner in the two programs. In both cases having selected Rotate above, the user must select a rotation point, then move the mouse to change the wall orientation (screen shot from 20-20 Design).



54. Walls have similar properties in both programs and there is extensive similarity in the selection and arrangement of dialog boxes and choices that appear:

Design 20-20

Wall Properties

Wall Group 1

- Wall 1
- Wall 2
- Wall 3

Dimensions

Type

Material

Length

Length: 76 1/16"

☒ Inside placement zone

☐ Outside placement zone

☒ Lengthen from beginning

☐ Lengthen from end

Height: 96"

Thickness: 4"

Reset to Wall Group 1

Type

☒ Wall

☐ Construction line

Placement Zone(s)

☒ Inside

☐ Outside

Reset to Wall Group 1

Ok

Cancel

Apply

ProKitchen

ProKitchen

Wall Attributes

Attributes

Wall Attributes

☒ Wall

☐ Construction Line

Wall Zones:

☒ Zone Inside

☐ Zone Outside

Wall Thickness 4"

Wall Height 96"

Ok

Cancel

55. Note that in both cases you are presented with the choices of changing a wall to/from a construction line, adding or removing the inside or outside placement zone, and changing thickness and height.

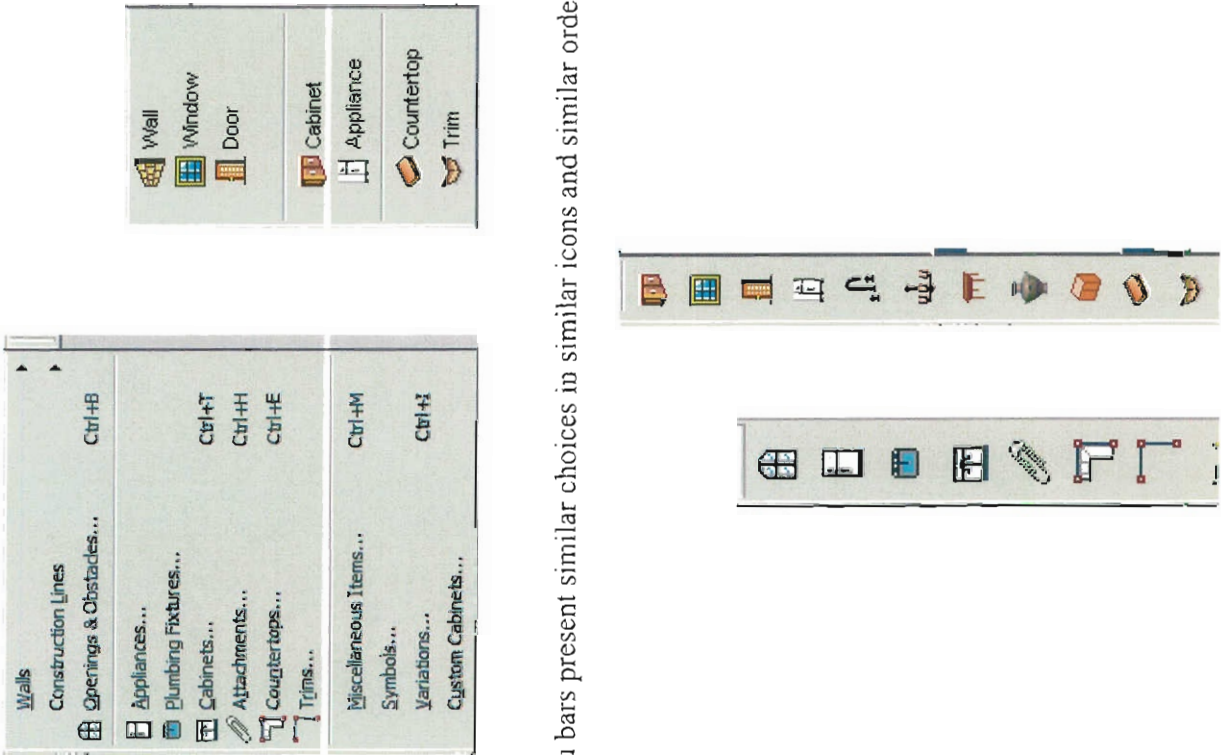
56. The interface for placing a wide variety of items (windows, doors, appliances, plumbing, cabinets, etc.) is again quite similar. As placing these items is a substantial part of using the program, the extensive overlap here is of note. First, there are four ways that both interfaces provide for placement:

- the Place menu
- the relevant icon on the vertical toolbar
- navigating through the catalog categories
- using the search/Find window

57. The functionality here – putting items into the design – is clearly required by the task; the choice of interface elements by which to accomplish this, however, is an expressive choice made by the program designers.

58. Once an item is placed on the design, in both programs the interface makes it clear that the item can be put against a wall, set against a construction line, or left free-standing. In the event that items are positioned by the user so that they would overlap, both program provide a collision detection warning.

59. The Place menus, as noted, have many of the same selections in the same order:



60. As also noted, the vertical menu bars present similar choices in similar icons and similar order: